## **CLAIMS**

1. A Luneberg lens having a single-layer structure or a multilayer structure containing a plurality of layers having different dielectric constants, wherein the respective structure is produced by mixing a polyolefin resin and/or a derivative thereof with an inorganic filler having a high dielectric constant, the volume ratio of the polyolefin resin and/or the derivative thereof to the filler being 99 to 50:1 to 50, adding a foaming agent to the resulting resin mixture and then performing preliminary expansion, and molding the resulting pre-expanded beads; and wherein at least a foamed dielectric layer having a dielectric constant of 1.5 or more is formed using the pre-expanded beads that have been subjected to classification and selection such that f(A) satisfies the expression  $0.0005 \le f(A) \le 0.1$ , where f(A) is represented by the equation:  $f(A) = \sigma a/A$  ave,  $\sigma a$  is the deviation of a gas volume fraction Ar in the foamed dielectric layer, and Aave is the average of the gas volume fractions Ars at positions in the foamed dielectric layer.

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- 2. The Luneberg lens according to claim 1, wherein the inorganic filler having a high dielectric constant comprises titanium oxide, a titanate, a zirconate, or a mixture thereof.
- 3. The Luneberg lens according to claim 2, wherein the titanate is barium titanate, strontium titanate, calcium titanate, or magnesium titanate.

4. The Luneberg lens according to claim 1 or 2, wherein the foamed dielectric layer having a dielectric constant of 1.5 or more is formed using the pre-expanded beads classified by gravity separation or size classification.

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5. A method of producing a Luneberg lens that satisfies the requirements described in claim 1, comprising the steps of:

mixing a polyolefin resin and/or a derivative thereof with an inorganic filler having a high dielectric constant, the volume ratio of the polyolefin resin and/or the derivative thereof to the filler being 99 to 50:1 to 50;

adding a foaming agent to the resulting resin mixture and then performing pre-expansion;

classifying and selecting the resulting pre-expanded beads by gravity separation or size classification; and

forming the classified and selected pre-expanded beads into a shape.